



Mahila Vikas Sanstha's

INDRAPRASTHA NEW ARTS COMMERCE & SCIENCE COLLEGE,

AT POST NALWADI, DIST. WARDHA (M.S.)

Accredited 'B' by NAAC

Approved by government
of Maharashtra

Affiliated to Rashtrasant Tukadoji
Maharaj Nagpur University, Nagpur

Recognised by U.G.C New Delhi
under section 2 (f) & 12 (b) of
UGC act 1956

BSC 4 Sem

Paper I

Unit I

- 1) In what respect chelates differ from ordinary complexes ? Explain bidentate chelating ligand giving one example of each type. Give any two industrial applications of chelates
- 2) Explain EAN concept. Calculate EAN in the following : (i) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ and
(ii) $[\text{Cr}(\text{NH}_3)_6]^{3+}$
- 3) Write IUPAC name of the following complexes : (i) $[\text{Cr}(\text{en})_3]\text{Cl}_3$ and (ii) $[\text{Ni}(\text{CN})_4]^{2-}$
- 4) Explain the structure and paramagnetic nature of $[\text{NiCl}_4]^{2-}$ using VBT.
- 5) On the basis of Werner's theory, explain how $\text{CoCl}_3 \cdot 5\text{NH}_3$ is different from $\text{CoCl}_3 \cdot 3\text{NH}_3$.
- 6) What are the postulates of Valence Bond Theory of complexes ? On the basis of V.B.T. discuss the structure of $[\text{Co}(\text{NH}_3)_6]^{3+}$
- 7) Draw the structure of Metal-EDTA Chelate.
- 8) Define coordination number
- 9) What is stability field of water ?
- 10) What is double salt ?

Unit II

- 1) Define Stereoisomerism. Mention various types of isomerism exhibited by complexes. Explain geometrical isomerism in 6-coordinated complexes.
- 2) What are Frost diagrams ? Draw the Frost diagram for Nitrogen in acidic condition (PH = 0).
- 3) Explain : (i) Ionisation isomerism and (ii) Linkage isomerism with one example of each.
- 4) Draw a simplified Pourbaix diagram for naturally occurring compounds of iron
- 5) Discuss optical isomerism exhibited by complexes with coordination number 6
- 6) What is Latimer diagram ? Give Latimer diagram indicating conversion of ClO_4^- (aq) to Cl^- (aq) in acidic solution. Write balanced reaction.
- 7) Draw a frost diagram of oxygen in acidic and basic solution.
- 8) What are Pourbaix diagram ? Draw it for iron species.
- 9) What is standard electrode potential.
- 10) What is Latimer diagram ? Explain diagram of chlorine in acidic medium . Give its application of Latimer diagram.



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Unit III

- 1) What are Organometallic compounds ? What is the action of (i) CO and (ii) CO₂ on alkyl lithium ? Write any two applications of organo-metallic compounds.
- 2) What are the Carbonyls ? How are they classified ? Discuss the structure and bonding in iron penta carbonyl.
- 3) Explain the structure of metal ethylenic complex with suitable example.
- 4) Write IUPAC name of the following compounds : (i) (C₆H₅AS) n (ii) C₂H₅BeH (iii) (C₂H₅)₄ Pb (iv) CH₃MgI and (v) C₂H₅HgOH.
- 5) Discuss the structure of Cr(CO)₆ and its diamagnetic nature
- 6) How are following compounds prepared : (i) Ni(CO)₄ from NiS and (ii) Fe(CO)₅ from Fe
- 7) What is ion exchange chromatography? Discuss in detail the experimental technique used in the separation of ions.
- 8) Discuss in brief column chromatography technique.
- 9) Define (I) R_f value (II) Eluent
- 10) What is meant by extraction technique ? How is it useful to determine the Ni²⁺ ions

Unit IV

- 1) Write the role of the Na⁺, K⁺ and Ca²⁺ ion in living systems.
- 2) What is Pearson's SHAB principle ? What are important applications of SHAB principle ?
- 3) Explain the role of Haemoglobin in transfer of oxygen
- 4) Write a note on sodium pump
- 5) Draw the structure of haemoglobin and myoglobin
- 6) Classify the following into soft and hard acids and bases : NH₃, Cd²⁺, I⁻, SO₄²⁻
- 7) What are silicones ? explain synthesis of straight chain and cross – linked silicones.
- 8) Explain various types of silicones elastomer. Give application of elastomer.
- 9) What are polyphosphazenes ? Give any two methods of preparation
- 10) Explain structure and bonding (N₂Cl₂)₄